

### **REMARKS**

By this Amendment, claim 1 is amended to merely clarify the recited subject matter.

Claims 1, 2, 4, 5 and 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hakansson (US 6,928,976) and Reininger (20030030431), claims 3 and 7 have been rejected under 35 U.S.C. 103(a) based on Hakansson Reininger and "Hall Effect Sensing and Application" by Honeywell (hereafter "Honeywell"), claim 8 has been rejected based on Hakansson, Reininger, Honeywell and Diong (US 20020165953), claim 9 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Hakansson, Reininger, Honeywell, Diong and Melgaard et al. (US 3,872,473; hereafter "Melgaard").

Applicant traverses the prior art rejections because the combined teachings of the cited prior art fail to teach or suggest all the features recited in the rejected claims. For example, the cited prior art fails to teach or suggest the claimed central lubrication system arrangement comprising a lubricant vessel, a pump unit, a control unit, pipe systems, a pressure monitor unit, **at least one feeder provided with at least one magnetizable piston which moves due to the influence of the pressure of a lubricant present in the pipe system to be lubricated**, a movement monitor unit for each feeder to monitor the operation of the system, the lubricant being arranged to be pumped from the lubricant vessel along the pipe system to the feeders and further to objects to be lubricated, **and a junction part located in the movement monitor unit outside a pressurized space of the feeder, wherein the junction part is manufactured from a weakly magnetizable material and comprises a sensor part which, in turn, comprises a fixed permanent magnet to generate a magnetic field, and a sensor for detecting movement of the magnetizable piston, and an electronics part which processes a signal received from the sensor and produced as a result of a change in the magnetic field caused by the movement of the piston with respect to the sensor part, and forwards this processed signal to the control unit**, as recited in independent claim 1 and its dependent claims.

Hakansson merely discloses an apparatus for transferring oil and which comprises a pump 3, a pipe 2 connected to a level pipe 5 and a pressure monitor for transferring oil from a container I to an internal combustion engine 4. However, Hakansson fails to disclose, teach or suggest a feeder having a magnetizable piston which moves due to the influence of the pressure of the oil present in the pipe system to be lubricated for feeding the oil.

Reininger fails to remedy this deficiency of Hakansson. Reininger describes means for detecting a position of a piston 11 and which comprises a sensor arrangement 14, located outside the pressure space in which the piston 11 is moving. The sensor arrangement 14 comprises sensors 15 and 16, which may be, for example, Hall sensors. However, Reininger merely teaches that the piston 11 may include permanent magnets 13 (see Figure 1, paragraphs [0013] - [0019]). Thus, the piston's position is detected by detecting the change in the magnetic field provided with the permanent magnets 13 as the piston 11 is moved sensed by the sensor arrangement 14.

To the contrary, in accordance with the claimed invention, the permanent magnet is located outside the pressure space in which the piston is moving; thus, the permanent magnets are not provided as part of the piston or mounted to it. Thus, the combined teachings of Hakansson and Reininger fail to teach or suggest the claimed invention including at least one feeder provided with at least one magnetizable piston which moves due to the influence of the pressure of a lubricant present in the pipe system to be lubricated, and further includes a movement monitor unit with the claimed junction part located in the movement monitor unit outside a pressurized space of the feeder, wherein the junction part is manufactured from a weakly magnetizable material and comprises the claimed sensor part and electronics part.

Moreover, it should be appreciated that Reininger fails to describe a lubricant system at all; rather, Reininger is directed only to a conventional detection arrangement. Thus, combining Hakansson and Reininger would merely provide an apparatus for transferring oil (as in Hakansson) equipped with a detection means (of Reininger) together with a piston. Thus, the combination of Hakansson and Reininger would still fail to disclose, teach or suggest a feeder having the claimed feeder with a magnetizable piston and movement monitor unit located outside the pressurized space of the feeder.

In fact, the detection means of Reininger has permanent magnets mounted to the piston. This solution corresponds the prior art technique described in the present application in paragraphs [0002] and [0003]. Such movement monitor units are conventionally used for monitoring movement of the piston of a feeder, and for controlling the operation of the system. In order to detect movement of the piston, the movement monitor unit comprises a switch. In the prior art, the switch is a magnetic switch that switches and releases at a predetermined strength of a magnetic field; thus, the field strengths for the "switching point"

and the “release point” differ in magnitudes, i.e., the switch operates based on the concept of “hysteresis.”

In the prior art, the bodies of feeders are manufactured both from a magnetizable (galvanized) and non-magnetizable (acid-proof) material so that the feeder body affects a change in the magnetic field caused by the piston and, the above-described operation points (“switching point” and “release point”). Thus, in order to work well, such conventional arrangements required a permanent magnet to be mounted to the piston so as to obtain a sufficient change in the magnetic field.

However, the use of a switch hysteresis concept restricts the ability to use a sensor in such a solution. This is because, excretion of small doses of the lubricant require a correspondingly small movement of the piston; however, when a lubricant having high viscosity, such as grease, is used as lubricant, very small doses must be able to be supplied at a given time. More specifically, a lubrication system must be capable of measuring small movements of the lubrication system piston moving in a space wherein large pressure variations (typically 0 to 250 bar) occur and, in addition, the diameter of the piston is small (typically 4 to 8 mm).

However, the use of such measurements are not possible with conventional structures in which a permanent magnet is mounted to or otherwise included in a piston moving the pressure space. This is because such measurement detection is not possible with sufficient accuracy at small movement lengths of the piston.

To the contrary, the present invention solves these problems of the conventional structures by providing an arrangement in which a junction part located in the movement monitor unit (outside a pressurized space) is manufactured from a weakly magnetable material and comprises a sensor part which, in turn, comprises a permanent magnet that generates a magnetic field. The sensor part also comprises a sensor for detecting movement of the magnetable piston. The sensor part also comprises an electronics part which processes a signal received from the sensor part, the signal being produced as a result of a change in the magnetic field caused by the movement of the piston with respect to the sensor part, and forwards this processed signal to the control unit.

Thus, the combined teachings of Hakansson and Reininger fail to teach or suggest the claimed invention including at least one feeder provided with at least one magnetizable piston which moves due to the influence of the pressure of a lubricant present in the pipe system to

be lubricated, and further includes a movement monitor unit with the claimed junction part located in the movement monitor unit outside a pressurized space of the feeder, wherein the junction part is manufactured from a weakly magnetizable material and comprises the claimed sensor part and electronics part.

Honeywell, Diong, and Melgaard fail to remedy the above-identified deficiencies of Hakansson and Reininger because Diong and Melgaard merely describe different types of control systems and Honeywell merely describes various applications of Hall sensors. Therefore, combined teachings of Hakansson and Reininger fail to teach or suggest the claimed invention including at least one feeder provided with at least one magnetizable piston, which moves due to the influence of the pressure of a lubricant present in the pipe system to be lubricated, and further includes a movement monitor unit with the claimed junction part located in the movement monitor unit outside a pressurized space of the feeder, wherein the junction part is manufactured from a weakly magnetizable material and comprises the claimed sensor part and electronics part.

In view of the above, it is submitted that all of the claims are in condition for allowance and such action is respectfully requested. If there is any issue remaining to be resolved, the examiner is invited to telephone the undersigned at (202) 371-6371 so that resolution can be promptly effected.

It is requested that, if necessary to effect a timely response, this paper be considered a Petition for an Extension of Time sufficient to effect a timely response with the fee for such extensions and shortages in other fees, being charged, or any overpayment in fees being credited, to the Account of Barnes & Thornburg LLP, Deposit Account No. 02-1010 (44655-324916).

Respectfully submitted,  
BARNES & THORNBURG LLP

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